Clean Copy of Amended Claims

1. (Amended) A substantially pure conotoxin peptide having the general formula I:

Xaa-Xaa_0-Xaa_1-Cys-Cys-Gly-Xaa_2-Xaa_3-Xaa_4-Cys-Xaa_5-Xaa_6-Cys-Xaa_7 (SEQ ID NO:1)

wherein Xaa is *des*-Xaa, Asn, Gln or pyro-Glu; Xaa_0 is *des*-Xaa_0, Gly, Ala, Glu, γ-carboxy-Glu (Gla) Asp, Asn, Ser, Thr, g-Asn (where g is glycosylation), g-Ser or g-Thr; Xaa_1 is Val, Ala, Gly, Leu, Ile,Ser, Thr, g-Asn, g-Ser or g-Thr; Xaa_2 is Phe, Tyr, meta-Tyr, ortho-Tyr, nor-Tyr, mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-phospho-Tyr, nitro-Tyr, Trp (D or L), neo-Trp, halo-Trp (D or L), any synthetic aromatic amino acid, an aliphatic amino acid bearing linear or branched saturated hydrocarbon chains or a non-natural derivatives of the aliphatic amino acid; Xaa_3 is Lys, Arg, homolysine, homoarginine, ornithine, nor-Lys, His, N-methyl-Lys, N,N'-dimethyl-Lys, N,N',N''-trimethyl-Lys, any synthetic basic amino acid, Ser, Thr, g-Ser, g-Thr or any hydroxylated synthetic residue; Xaa_4 is an aliphatic amino acid bearing linear or branched saturated hydrocarbon chains or a non-natural derivative of the aliphatic amino acid, Met, Phe, Tyr, meta-Tyr, ortho-Tyr, nor-Tyr, mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-phospho-Tyr, nitro-Tyr, Trp (D or L), neo-Trp, halo-Trp (D or L) or any synthetic aromatic amino acid; Xaa_5 is His, Ser, Thr, g-Ser, g-Thr, an aliphatic amino acid bearing linear or branched saturated hydrocarbon chains, a non-natural derivative of the aliphatic amino acid, Phe, Tyr, meta-Tyr, ortho-Tyr, nor-Tyr, mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-phospho-Tyr, nitro-Tyr, Trp (D or L), neo-Trp, halo-Trp (D or L) or a synthetic aromatic amino acid; Xaa_6 is Pro, hydroxy- Pro (Hyp) or g-Hyp; Xaa_7 is *des*-Xaa_7, Gly, Ala, Lys,Arg, homolysine, homoarginine, ornithine, nor-Lys, His, N-methyl-Lys, N,N'-dimethyl-Lys, N,N',N''-trimethyl-Lys or any synthetic basic amino acid; and the C-terminus contains a free carboxyl group or an amide group.

2. (Amended) The substantially pure conotoxin peptide of claim 1 selected from the group consisting of:

Asn-Gly-Val-Cys-Cys-Gly-Xaa_1-Xaa_2-Leu-Cys-His-Xaa_3-Cys (SEQ ID NO:2); and

Gly-Val-Cys-Cys-Gly-Xaa_1-Xaa_2-Leu-Cys-His-Xaa_3-Cys (SEQ ID NO:3);

A4 conclude

wherein Xaa_1 is Tyr, mono-halo-Tyr, di-halo-Tyr, O-sulpho-Tyr, O-phospho-Tyr, nitro-Tyr; Xaa_2 is Lys, N-methy-Lys, N,N-dimethyl-Lys or N,N,N-trimethyl-Lys; Xaa_3 is Pro or hydroxy-Pro; and the C-terminus contains a carboxyl or amide group.

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7. (Amended) The substantially pure conotoxin peptide of claim 2, wherein Xaa_1 is Tyr, Xaa_2 is Lys, and Xaa_3 is hydroxy-Pro.

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12. (Amended) A substantially pure conotoxin peptide derivative comprising the peptide of claim 2, wherein at least one amino acid residue is substituted, said substitution being selected from the group consisting of an Xaa_2 residue substituted by Arg, ornithine, homoarginine, nor-Lys, or any synthetic basic amino acid; a Tyr residue substituted with any synthetic aromatic containing amino acid; a Ser residue substituted with Thr or any synthetic hydroxy containing amino acid; a Thr residue substituted with Ser or any synthetic hydroxy containing amino acid; a Phe residue substituted with any synthetic aromatic amino acid; a Trp residue substituted with any synthetic aromatic amino acid; an Asn residue glycosylated; a Ser residue glycosylated; a Thr residue glycosylated; a Hyp residue glycosylated; a Cys residue in D or L configuration; a Cys residue substituted with homocysteine (D or L); a Tyr residue substituted with the 3-hydroxyl or 2-hydroxyl isomers (meta-Tyr or ortho-Tyr, respectively) and corresponding O-sulpho- and O-phospho-derivatives; an acidic amino acid residue substituted with any synthetic acidic amino acid; a pair of Cys residues replaced pairwise with isoteric lactam or ester-thioether replacements; and an aliphatic amino acid substituted by synthetic derivatives bearing non-natural aliphatic branched or linear side chains C_nH_{2n+2} up to and including n=8.

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24. (Amended) The method of claim 20, wherein the amount of conotoxin peptide administered is between about 0.001 mg/kg to about 250 mg/kg.

A8 29. (Amended) An isolated conotoxin propeptide having the amino acid sequence set forth in SEQ ID NO:12.

Clean Copy of Newly Added Claims

32. (New) The substantially pure conotoxin peptide of claim 1, wherein said aliphatic amino acid bearing linear or branched saturated hydrocarbon chains is Leu (D or L), Ile, or Val.

33. (New) The substantially pure conotoxin peptide derivative of claim 12, wherein said synthetic acidic amino acid is a tetrazolyl derivative of Gly or Ala.

34. (New) The substantially pure conotoxin peptide derivative of claim 12, wherein said isoteric lactam or esterthioether replacements are Ser/(Glu or Asp), Lys/(Glu or Asp), or Cys/Ala combinations.